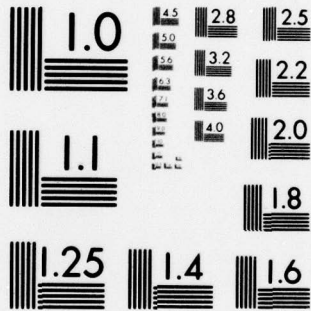


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Procurement of Naval Ships

*It is time for the US Navy
to acknowledge its shipbuilders
may be holding*

a winning hand

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② **LEVEL** II

⑥ **PROCUREMENT OF NAVAL SHIPS:**

**IT IS TIME FOR THE US NAVY
TO ACKNOWLEDGE
ITS SHIPBUILDERS MAY BE HOLDING
A WINNING HAND,**

by

⑩ **Captain Brady M. Cole, USN**

The Industrial College of the Armed Forces

**Associate Research Fellow
Research Directorate**

⑭ **NATIONAL SECURITY AFFAIRS MONOGRAPH SERIES 79-5**

⑪ **September 1979**

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FOREWORD

Disputes between the United States Navy and the Nation's shipbuilders over naval ship procurement contracts have attracted considerable attention in the press and in the Congress. Naval ships are expensive, complex weapons systems requiring years of planning, design, building, and outfitting, and the Navy has found itself in an adversary relationship with an industry upon which it is totally dependent to maintain the fleet.

This study
Captain Brady M. Cole traces the evolution of the Navy's serious problems in parallel with the shipbuilding industry's decline on the world market since World War II. A major portion of the industry's business now comes from government funding. While the number of shipbuilders has decreased, the industry has been dominated by a relatively small number of large corporations for whom shipbuilding is only a minor portion of their corporate business. In turn, the Navy is totally dependent on an industry increasingly inclined to challenge the Navy's procurement and contracting requirements. *The report*

Captain Cole suggests that the Navy adopt a more realistic attitude toward the procurement of its ships, and accept the changes which have occurred in the shipbuilding industry. He recommends several specific procedural and contracting changes which might restore a measure of efficiency to the management of the procurement process.

R.G. GARD, JR.
Lieutenant General, USA
President

ABOUT THE AUTHOR

Captain Brady M. Cole, USN, wrote this paper while an Associate Research Fellow in the Research Directorate of the National Defense University and a student at the Industrial College of the Armed Forces in 1977-1978. He received a bachelor's degree in business administration at Texas University in 1958 and an MBA from Harvard Business School in 1969. After military service in Japan and as Assistant Director for Supply Administration in the Bureau of Supply and Accounts in Washington in 1962, he became Assistant to the Director for Finance, Naval Reactors (AEC) in Germantown, Maryland, from 1962 until 1967. He was Director of the Special Equipment Division, Ships Parts Control Center, Mechanicsburg, Pennsylvania, from 1969 to 1971; Supply Officer, U.S.S. *Tripoli* (LPH-10), San Diego, California, from 1971 to 1973; and Contracts Officer, Supervisor of Shipbuilding, Newport News, Virginia, from 1973 to 1977. Captain Cole is currently assigned to the Office of the Under Secretary of Defense for Research and Engineering (Acquisitions Policy).

THE GENERAL APPROACH

Turning concern over material and supplies into affairs of state may worsen the state of affairs.

Anonymous

A degree of conflict is to be expected between a buyer and a seller. In recent years, however, the US Navy and its shipbuilders have managed to escalate such disagreement to the point where an environment has been created which is neither businesslike nor conducive to the orderly authorization and construction of naval ships. This brief examination was initiated with a view toward suggesting some changes in the acquisition process which would mitigate the adversarial relationship currently existing between the US Navy and its shipbuilders.

This study is directed toward those areas where shipbuilding conflicts are most prevalent. Thus, only the major US shipyards capable of constructing the larger naval vessels—such as destroyers and submarines—will be examined. Further, while ship repair and conversion account for a major segment of the shipbuilding industry (with over 500 small firms engaged in such activities), only *new ship construction* will be studied.

This study is based generally upon data available in the open literature. In addition, information gathered during personal interviews of high-level shipbuilding officials in Great Britain, France, West Germany, and Sweden, has been incorporated where relevant.

Support for the conclusions and recommendations has been introduced in what is intended to be a logical and natural sequence. The section which follows this introduction focuses on the unique characteristics of the US shipbuilding market which make it imperative for US shipbuilders and the US Navy to continue to deal with each other in spite of the ongoing controversy.

Next, the paper addresses the most important reasons why this corrosive situation has grown to nearly unmanageable proportions. Finally, several recommendations are offered which, if implemented, should restore momentum, integrity, and equilibrium to the construction portion of the US Navy's shipbuilding program, by accomplishing the following goals:

- Encourage contractors to use their management talents to meet contractual quality and schedule constraints while minimizing costs.
- Reduce the need for both parties to employ their power bases to resolve contractual disputes.
- Allow for orderly modifications of contracts during construction periods.

THE CHARACTER OF US SHIPBUILDING or WHY PLAY THE GAME AT ALL?

The Navy's 10-year pattern of coaxing, cajoling, bullying, and arm-twisting shipbuilders and suppliers to take marginal, high-risk and frequently unprofitable business—all with promises of future rainbows if they acquiesce and economic disaster if they refuse—is just about over.

John P. Diesel
President and Chief Executive Officer
Newport News Shipbuilding¹

Why, indeed, do the US Navy and the US shipbuilding industry continue to execute contracts with each other in spite of their protracted, public controversy? The answer is quite simple. They have no alternatives. Both parties—private and public—have become “locked in” to a symbiotic relationship where they must depend on each other. This fact is fundamental and must be kept in mind when exploring methods of improving future relations between these two parties. The remainder of this chapter will address the major reasons why this relationship exists.

First, the nature of the American shipbuilding market is very different from that of other principal shipbuilding countries. America's technical, political, and economic environments have interacted to spawn a protected “war” related industry which has not been competitive in the world market since 1850.² As can be seen from Table 1, the United States is a relatively minor competitor in the world merchant shipbuilding market, since it produced less than 2.3 percent of the gross tonnage delivered during the period 1967 through 1977. This situation can be attributed primarily to higher US shipbuilding costs. According to most industry observers, few shipyards in the world are highly profitable. Most countries make it possible for their shipbuilders to compete by providing either direct subsidies or exemptions from certain restrictions.

At the present time the commercial market for the US shipbuilding industry is almost totally limited to US coastal shipping operators taking advantage of the *Merchant Marine Act of 1920 (Jones Act)*³ and those shipping companies that wish to take advantage of government subsidizations (i.e., construction differential subsidies and

operating differential subsidies) provided by the *Merchant Marine Acts of 1936 and 1970*.⁴ Thus, the US market is essentially a closed system which is unique in that the United States is the only shipbuilding nation with a commercial market limited to its own flag vessels.⁵

Equally important is the fact that approximately 90 percent of the US shipyard output since World War II has been financed by the Government through subsidies either for merchant ship construction or naval vessel construction and conversion.⁶ Table 2 indicates that the number and tonnage of subsidized vessels are still significant even though they have been declining in recent years. More important, however, is the fact that the US Navy has been the largest single customer of the US shipbuilding industry. In fact, if one looks only at naval vessels, the United States shares world leadership (with the Soviet Union) in ship construction. Considering both naval and merchant ship construction, the United States is still one of the top three world shipbuilding nations (along with the Soviet Union and Japan) by virtue of its total shipyard employment, shipbuilding facilities, and shipbuilding technology.⁷

The US shipbuilders, therefore, are important in terms of total construction, but they are selling to a restricted market which is dominated in general by the Government and in particular by the US Navy. It would appear that the US Navy should be in an excellent position to determine the character and direction of the US shipbuilding industry, but it, too, has limited its options.

Initially, new construction effort for naval ships was split between US naval shipyards and the private shipbuilders. As the Navy has come to depend on new systems and equipment of a highly scientific content, it has also grown to depend less and less on its own internal resources to design and produce its systems. By the early 1960's, only a few auxiliaries, landing craft, and nuclear submarines were being built in naval shipyards. The last ship was assigned to a naval shipyard in 1967. Since that time, the Navy has placed total reliance on private industry for construction of its ships.

Table 1.

Share of Oceangoing Merchant Ships Delivered by the Principal World Shipbuilding Countries

Shipbuilding country	Percent share by year											
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
United Kingdom	7.8	6.2	4.4	6.3	5.1	4.5	3.5	3.6	3.4	4.4	3.7	6.2
Denmark	2.8	3.1	3.2	2.5	3.0	3.6	3.3	3.2	2.8	3.0	2.6	1.9
France	2.7	3.7	3.7	3.6	4.5	3.9	3.8	3.1	3.4	4.9	4.0	2.4
East Germany	1.8	1.8	1.7	1.6	1.2	1.2	1.0	1.0	1.0	1.0	1.4	2.3
West Germany	6.9	7.2	9.5	6.2	8.1	5.2	6.3	6.4	7.3	5.5	5.8	4.6
Italy	3.3	3.0	1.9	2.6	3.6	3.4	2.8	2.8	2.3	2.1	2.8	1.9
Japan	47.6	49.6	48.9	48.1	45.6	48.1	48.5	50.4	49.7	46.8	42.5	34.7
Netherlands	1.9	1.6	2.6	3.0	2.3	2.8	2.8	2.8	3.0	1.9	0.9	1.7
Norway	3.5	3.6	3.3	3.3	3.6	3.1	3.2	2.9	3.1	2.2	2.1	1.8
Poland	2.5	2.5	2.3	2.0	1.9	2.0	1.9	1.5	2.1	1.7	1.7	3.7
Spain	2.3	2.7	3.4	3.1	3.4	4.0	4.3	4.7	4.7	3.9	6.6	4.5
Sweden	9.0	6.5	6.7	7.3	7.6	7.6	7.5	6.5	6.4	7.4	8.4	7.7
United States	1.4	2.1	2.5	1.8	2.0	1.8	3.1	2.2	1.4	2.4	3.6	5.7
Yugoslavia	1.7	1.9	1.6	1.8	1.6	2.5	1.5	2.1	1.9	1.8	1.5	1.6
Gross Tonnage (millions of tons)												
World totals	15.2	16.8	18.7	21.0	24.4	26.7	30.4	33.4	34.2	33.9	27.5	—

Note: Gross tonnage figures exclude USSR and Romania (Prior to 1970) and People's Republic of China (Prior to 1977).

Source: Lloyd's Register of Shipping: *Annual Summary of Merchant Ships Completed in the World During 1977*; and US Maritime Administration.

Table 2.

Merchant Vessels Under Construction and Subsidized by the Maritime Administration*

Year	Number	Percent of Total	Deadweight tons (thousands)	Percent of Total
1964	36	78.3	432.3	65.1
1965	49	94.2	567.7	84.1
1966	57	83.8	573.9	59.2
1967	62	74.7	687.7	58.1
1968	58	65.9	775.3	41.3
1969	43	63.2	738.0	36.9
1970	29	53.7	547.4	25.8
1971	29	55.9	614.1	25.9
1972	31	52.5	913.5	31.9
1973	48	51.6	2807.7	62.1
1974	57	61.9	4081.6	67.4
1975	43	47.8	5100.0	61.4
1976	37	48.1	4300.0	56.6
1977	30	42.3	3200.0	47.8
1978	27	47.4	2200.0	44.0

*Vessels 2000 gross tons and larger building or on order on January 1.

Source: US Maritime Administration

Government regulations and procurement practices, together with increasingly sophisticated ships, have combined to create a specialized government market served by a limited number of companies which have developed capabilities different from those required for successful operation in traditional commercial markets.

In the United States, there remain only 27 private shipyards which are even *capable* of constructing oceangoing merchant or naval vessels.⁸ Of these, only 14 are currently active in the merchant and/or naval markets. Furthermore, of these active firms, only 9 were actually engaged in *naval* shipbuilding as of 1 January 1978. Table 3 lists these 14 major shipbuilders, indicating their primary market ac-

tivity (merchant or naval or, in some cases, both). Figure 1 shows that these shipyards are somewhat clustered in four coastal regions of the continental United States: the Northeast, Central Gulf, Southern California, and Pacific Northwest.

Table 3.

Major Private US Shipbuilders

Shipbuilder	Merchant	Naval
Avondale Shipyard, Inc.	X	X
Bath Iron Works Corp.	X	X
Bethlehem Steel Corp., Sparrows Point Shipyard	X	
FMC Shipyards	X	
General Dynamics, Electric Boat Division		X
General Dynamics, Quincy Shipbuilding Division	X	
Litton Industries, Inc., Ingalls Shipbuilding Division		X
Lockheed Shipbuilding Inc. & Construction Company ...		X
National Steel and Shipbuilding Company	X	X
Newport News Shipbuilding and Drydock Company	X	X
Seatrain Shipbuilding Corporation	X	
Sun Shipbuilding and Drydock Company	X	
Todd Shipyards Corp., San Pedro Division	X	X
Todd Shipyards Corp., Seattle Division		X

Source: Based on Gary Lee Kavanagh, *The United States Shipbuilding Industry and Influences of Conglomerates*, Technical Report prepared for the Office of Naval Research (AD No. A041755), June 1977, p. 85.

Tables 4 and 5 show the share of the merchant and naval shipbuilding market sectors for each major private shipyard during the 1967-1976 period. A trend is evident: although no single shipbuilder dominates US shipbuilding, the industry concentrates increasingly into a few leading companies—especially in the naval sector. For example, in the naval sector, Litton, Newport News, and General Dynamics—Electric Boat Division, have become the top three; and in the merchant sector, National Steel and Shipbuilding Company

(NASSCO) and Newport News Shipbuilding have recently joined Avondale and Bethlehem-Sparrows Point as the top four shipyards, holding over 70 percent of the merchant shipbuilding backlog at the beginning of 1977.⁹

Table 4.

**Market Share of the Merchant Shipbuilding Sector for Each of the Principal US Shipbuilders
(Percent of Deadweight Tons Building or Contracted 1 January)**

Shipbuilder	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967
National Steel	21.4	9.9	23.6	8.4	5.6	—	—	—	0.3	1.0
Litton Shipyard	—	—	0.3	3.1	10.0	14.9	15.5	11.3	31.4	41.4
Bethlehem-Sparrows Point	13.2	19.3	28.2	33.3	34.6	39.0	42.2	34.7	19.7	10.1
Todd Shipyards	1.8	7.5	4.1	6.0	0.4	—	—	—	—	—
Newport News	17.4	18.2	3.1	4.3	—	—	—	4.4	5.7	9.1
Sun Shipbuilding	3.5	3.7	2.6	2.2	8.8	18.8	14.0	10.2	6.4	13.1
Avondale	17.6	16.7	8.6	9.8	14.8	11.7	20.8	28.7	33.0	13.1
Bath Iron Works	0.8	2.0	3.3	5.2	1.7	2.1	—	1.6	2.4	3.9
General Dynamics—Quincy	6.5	8.0	8.7	5.8	2.8	3.4	3.8	4.0	—	—
Lockheed	—	—	0.1	0.8	1.0	—	—	—	—	1.3
FMC Shipyard	2.7	2.8	2.9	—	—	—	—	—	—	—
Seatrain	8.0	9.0	11.1	14.9	15.7	9.5	—	—	—	—
Others	7.1	2.9	3.4	6.2	4.6	0.6	3.7	5.1	1.1	7.0

Source: Gary Lee Kavanagh, *The United States Shipbuilding Industry and Influences of Conglomerates*, Technical Report prepared for the Office of Naval Research (AD No. A041755), June 1977, p. 91.

Table 5.

Market Share of the Naval Shipbuilding Sector for Each of the Principal US Shipbuilders
(Percent of Deadweight Tons Building or Contracted 1 January)

Shipbuilder	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967
National Steel	6.3	4.6	4.9	4.7	3.8	7.8	12.2	12.9	12.2	8.3
Litton Shipyards	44.6	38.8	42.2	41.1	41.8	24.4	19.1	11.2	3.0	5.4
Bethlehem-Sparrows Point	—	—	—	—	—	1.7	3.3	2.7	2.1	2.6
Todd Shipyards	—	—	—	—	—	1.7	3.5	4.0	3.5	3.9
Newport News	23.4	32.3	35.4	34.0	30.6	23.5	11.9	15.4	19.0	15.2
Sun Shipbuilding	—	—	—	—	—	—	—	—	—	—
Avondale	—	—	0.5	3.4	7.0	8.7	10.0	9.1	10.1	18.4
Bath Iron Works	0.4	0.4	0.5	—	—	—	0.3	1.7	0.7	2.0
General Dynamics—Quincy	—	—	—	8.0	7.5	15.4	19.2	21.0	23.4	12.8
Lockheed	7.4	8.4	—	1.2	2.3	4.1	7.8	7.3	8.0	8.3
FMC Shipyard	—	—	—	—	—	—	—	—	—	—
Seatrain	—	—	—	—	—	—	—	—	—	—
General Dynamics—Electric Boat Div.	17.8	15.5	16.5	7.0	6.0	4.5	3.4	5.0	4.0	6.4
Naval Shipyards	—	—	—	0.6	1.1	8.1	9.4	9.7	13.7	16.2
Others	—	—	—	—	—	—	—	—	0.2	0.5

Source: Gary Lee Kavanagh, *The United States Shipbuilding Industry and Influences of Conglomerates*, Technical Report prepared for the Office of Naval Research (AD No. A041755), June 1977, p. 92.

United States shipbuilders, vastly more dependent on the mood of Congress and the US Navy than on the open market, have operated for many years under critical uncertainty concerning the rate at which government funds would be appropriated to replace existing naval and merchant fleets and the extent to which government policies would expand or curtail their protection. As a direct result, the US shipbuilders have become heavily dependent on the government customer. At the same time, the US Navy has voluntarily eliminated its capacity to construct ships and has come to rely almost entirely on a small number of shipbuilders. Thus, it has come to pass that both parties must "play the game" because they are almost totally dependent on each other for survival as institutions. The only realistic course of action would appear to be that these two institutions cooperate with each other. It will be useful to explore the major reasons why this course of action has not been followed.



Figure 1. Geographical Location of the Major US Shipyards Shipyards:

1. Avondale Shipyards (Ogden Corp.), New Orleans, Louisiana
2. Bath Iron Works (Congoleum Corp.), Bath, Maine
3. Electric Boat Division (General Dynamics Corp.), Groton, Connecticut
4. FMC Shipyard (FMC Corp.), Portland, Oregon
5. Ingalls Shipyard (Litton Industries), Pascagoula, Mississippi

6. Lockheed Shipbuilding and Construction (Lockheed Aircraft),
Seattle, Washington
7. National Steel & Shipbuilding Co. (Kaiser Industries), San Diego,
California
8. Newport News Shipbuilding & Drydock Co. (Tenneco Inc.),
Newport News, Virginia
9. Quincy Shipbuilding Division (General Dynamics Corp.), Quincy,
Massachusetts
10. Seatrain Shipyard (Seatrain Lines Inc.), New York, New York
11. Sparrows Point Shipyard (Bethlehem Steel Co.), Sparrows Point,
Maryland
12. Sun Shipbuilding & Dryrock Co. (Sun Oil Co.), Chester,
Pennsylvania
13. Todd Shipyard, San Pedro, California
14. Todd Shipyard, Seattle, Washington

INDUSTRY STRUCTURE

or

WHO REALLY CONTROLS MAJOR US SHIPYARDS?

You just can't get an elephant to do ballet. You can only get it to do what elephants do.

F. David Mathews
Former Secretary of Health,
Education and Welfare
(1975)

One of the major reasons why the US shipbuilding industry has had the stamina and the will to engage in a protracted conflict with the US Navy is the fact that the shipyards are no longer independent enterprises. The US shipbuilding industry began to accelerate its transition from independent shipyards to divisions of large corporations in 1959. The pace of this trend was as follows:

Shipbuilding Company	Acquired by	Year Acquired
Avondale Shipyards	Ogden Corp.	1959
Puget Sound Bridge & Dredging Co.	Lockheed Aircraft	1959
Ingalls Shipbuilding	Litton Industries	1961
National Steel & Shipbuilding Co.	Kaiser Industries (50%) Morrison-Knudson (50%)	1961
Gunderson Brothers Shipyard	FMC Corp.	1965
Newport News Shipbuilding & Drydock Co.	Tenneco Inc.	1968

Other changes have taken place. In 1964, Bethlehem Steel Corporation (Shipbuilding Division) closed its Quincy, Massachusetts shipyard and sold it to the General Dynamics Corporation. The Quincy facility gave General Dynamics the capability to construct both merchant and naval surface ships. Until that acquisition, Gen-

NOTE: This section is based largely on Gary Lee Kavanagh, *The United States Shipbuilding Industry and Influences of Conglomerates*, Technical Report prepared for the Office of Naval Research (AD No. AO41755), June 1977, pp. 127-138. Data has been supplemented and updated where appropriate.

eral Dynamics' shipbuilding activities were limited to submarine construction at its Electric Boat Division. Bethlehem Steel's disposition of the Quincy shipyard resulted from corporate financial difficulties coupled with a decision to withdraw from naval ship construction, which had been the primary function of the Quincy yard. This policy has been adhered to by Bethlehem Steel Corporation with the exception of contracts for two ammunition ships which were completed at its Sparrows Point shipyard in 1965.

Bath Iron Works merged with the flooring manufacturing firm, Congoleum-Nairn, in 1967. Bath was almost totally dedicated to shipbuilding and was long considered to be the premier builder of Navy destroyers. Through further corporate diversifications into the home furnishings industry, the Bath shipbuilding company has been absorbed into the Congoleum Corporation. Shipbuilding now represents only a minor portion of the overall corporate business activities.

In 1969, Seatrain Lines, Inc. took over the facilities of the former New York Yard on a long-term lease arrangement from the Government, with federal and New York City financial assistance. In turn, it agreed to hire and train 9,000 workers, most of whom were hard-core unemployed, over a period of 5 years. The Seatrain shipyard is now engaged in construction of 225,000 deadweight ton (dwt) supertankers.

Table 6 lists the parent companies of major US shipbuilders and their corporate classifications. Virtually all of the major shipbuilders are now controlled by very large corporations. Table 7 presents the May 1978 "Fortune 500" rankings of the 12 major parent corporations, showing that most rank very high in national industry. Tables 8 and 9 present brief divisional profiles for the conglomerates and corporations respectively, showing the percentage of overall business activities represented by shipbuilding and repair work. The major point which should be drawn from this data is that, for the most part, major naval shipbuilders are now only a subset of a more politically powerful and financially stronger business amalgamation, whose top management is located elsewhere and interested in other problems. This development has had a major impact on the US Navy's shipbuilding program in that it changed the relationship of the two parties to one of asymmetrical interdependence—the shipbuilders can now tolerate a rupture of the relationship more easily than can the US Navy.

Given that major corporations bought their way into an industry with traditionally low profits, it is also instructive to speculate on their reasons for doing so. Although it is generally not possible to determine the exact reason for a particular merger, review of some known factors can yield greater insight into the motivation for entrance of major corporations into the shipbuilding industry. Pressure to fulfill these expectations has also played a significant role in escalating and sustaining the present controversy.

Table 6.

Major US Shipbuilder Corporate Classifications

Shipyard	Parent Corporation	Classification
Avondale Shipyards	Ogden Corporation	Conglomerate
Bath Iron Works	Congoleum Corporation	Conglomerate
Electric Boat Division	General Dynamics	Aerospace and Defense Corporation
FMC Shipbuilding	FMC Corporation	Conglomerate
Ingalls Shipyard	Litton Industries	Conglomerate
Lockheed Shipbuilding and Construction	Lockheed Aircraft	Aerospace and Defense Corporation
National Steel and Shipbuilding Company (NASSCO)	Kaiser Industries*	Conglomerate
Newport News Shipbuilding and Drydock Company	Tenneco Inc.	Conglomerate
Quincy Shipbuilding Division	General Dynamics	Aerospace and Defense Corporation
Seatrains Shipyard	Seatrains Lines	Shipping Corporation
Sparrows Point Shipyard	Bethlehem Steel Corporation	Steel Corporation
Sun Shipbuilding	Sun Oil Company	Oil Corporation
Todd San Pedro Shipyard	Todd Shipyards Inc.	Shipbuilding Corporation
Todd Seattle Shipyard	Todd Shipyards Inc.	Shipbuilding Corporation

*NASSCO is in dual ownership of Kaiser Industries (50 percent) and Morrison Knudsen Inc. (50 percent) but management and operational control lies with Kaiser Industries.

Table 7.

1978 Fortune 500 Rankings of Major US Shipbuilding Parent Corporations

<i>Parent Corporation</i>	Rank according to:		
	Sales	Assets	Net Income
Bethlehem Steel	35th	28th	491st
Congoleum Corporation	453d	437th	339th
FMC Corporation	103d	82d	94th
General Dynamics	85th	120th	126th
Kaiser Steel	315th	197th	460th
Litton Industries	69th	88th	219th
Lockheed Aircraft	71st	127th	221st
Ogden Corporation	156th	189th	233d
Seatrains Lines	N/L	N/L	N/L
Sun Oil Company	23d	26th	27th
Tenneco Inc.	19th	15th	21st
Todd Shipyards	N/L	N/L	N/L

N/L = Not Listed

Source: Compiled from "Fortune's Directory of the 500 Largest US Industrial Corporations," *Fortune*, 8 May 1978.

Table 8.

Brief Shipbuilding Conglomerate Divisional Profiles

Conglomerate	Share of 1977 Revenues
<i>Tenneco Inc. (Newport News Shipbuilding & Drydock Co.)</i>	
Integrated Oil	22%
Natural Gas Pipelines	24%
Construction and Farm Equipment	20%
Shipbuilding	10%

Table 8 (continued)

Conglomerate		Share of 1977 Revenues
Automotive		9%
Chemicals		6%
Packaging		6%
Agriculture Land Management		3%
<i>Litton Industries (Ingalls/Litton Shipbuilding)</i>		
Business Systems and Equipment		30%
Defense, Commercial and Marine Systems:		
Navigational Control Systems		8%
Commercial and Data Systems		6%
Marine Engineering Production		21%
Industrial Systems and Equipment		19%
Professional Services and Equipment		16%
<i>Ogden Corporation (Avondale Shipyards)</i>		
Metals (Recycling, scrap, smelting, refining)		37%
Marine Construction		27%
Shipping		6%
Marine Terminals		7%
Food Products		9%
Food Service		11%
Leisure Service		3%
<i>FMC Corporation (FMC Shipyard)</i>		
Food and Agriculture Machinery and Chemicals		18%
Industrial Chemicals		25%
Material and Natural Resource Handling Equipment (Including shipbuilding)		24%
Construction and Power Transmission Products		15%
Government and Municipal Equipment		15%
Special Products		3%

Table 8 (continued)

Conglomerate	Share of 1977 Revenues
<i>Congoleum Corporation (Bath Iron Works)</i>	
Home Furnishings	4 %
Shipbuilding	35%
Automotive and Industrial Products	24%
<i>Kaiser Industries (50 percent NASSCO) (1975 Earnings—1977 Data Not Available)</i>	
Kaiser Steel	32%
Kaiser Engineering	5%
Aerospace & Electronics, Kaiser Broadcasting, Sand and Gravel, Shipping, and Other	
	1%
Equity in Earnings from Unconsolidated Holdings:	
Aluminum	34%
Kaiser Resources	19%
Hamersely Holdings	7%
Kaiser Cement and Gypsum	1%
NASSCO	1%
<i>Morrison-Knudson (50 percent NASSCO)</i>	
Heavy Construction	26%
Industrial Construction	24%
Contract Mining and Related Work	13%
Engineering	9%
Pipelines, Pipecoatings	8%
Building, Housing Projects	11%
Marine Construction	1%
Specialized Fields	8%

Source: Compiled from Forms 10K (Annual Report Pursuant to Section 13 of the Securities and Exchange Act of 1934) and Annual Reports from each company.

Table 9.

Brief Shipbuilding Corporate Divisional Profiles

Corporation	Share of 1977 Revenues
<i>Lockheed Aircraft</i> (Lockheed Shipbuilding and Construction Company)	
Aircraft	58%
Missiles, Space and Electronics	36%
Shipbuilding and Other	6%
<i>Seatrain Lines</i> (Seatrain Shipyard)	
Water Transportation	63%
Shipbuilding	4%
Energy	33%
<i>Sun Oil Company</i> (Sun Shipbuilding)	
Refined Products	75%
Crude, Condensate and Synthetic Crude	11%
Natural Gas	7%
Related Products and Service	7%
Shipbuilding and Repair	*
<i>Todd Shipyards Inc.</i> (Todd Shipyards)	
Marine Construction	41%
Marine Conversion/Repair	59%
<i>General Dynamics Inc.</i> (Quincy and Electric Boat Divisions)	
Military Aircraft	17%
Commercial Aircraft	3%
Tactical Missiles	11%

Table 9 (continued)

Corporation	Share of 1977 Revenues
General Dynamics Inc. (continued)	
Space Systems	4%
Marine Construction and Repair—Submarines	23%
Marine Construction and Repair—Other	16%
Material Service and Resources	15%
Telecommunications	6%
Data Products	2%
Other	3%

Bethlehem Steel Corporation (Sparrows Point Shipyard)

Steel Mill Products	73%
Manufactured and Fabricated Products	14%
Other Products and Activities Related to Steel Operations	5%
All Other Products and Services (Including Marine Construction)	8%

*Divisions not listed. Shipbuilding approximately 1%.

Source: Compiled from Forms 10K (Annual Report Pursuant to Section 13 of the Securities and Exchange Act of 1934) and Annual Reports from each company.

A typical problem which faces many corporations is a lack of cash available for further diversification. The single most important factor, therefore, which drew major corporations toward acquisition of shipbuilders was the US Navy's policy of making progress payments during ship construction. Until about 1970, the Navy routinely made progress payments to shipbuilders on a weekly basis. Since the shipbuilder generally paid a large portion of the early bills on a monthly basis, it, in effect, was given a free loan for a period of time.

Some other more specific motives for merger are:

—Avondale Shipyards, established in 1938 and specializing in construction of barges and small oceangoing vessels, began a

steady growth following World War II. In 1958, the shipyard was awarded its first contract for construction of large merchant vessels. This was followed by award of more large oceangoing ship construction contracts, establishing Avondale as a large builder of seagoing vessels. At that time, the original owners were having problems coping with the expanded financial and managerial demands experienced by many small, closely held corporations which had become large. Ogden Corporation recognized this and acquired the Avondale Shipyards in 1959.¹⁰

—Newport News Shipbuilding and Drydock Company offered Tenneco an opportunity for considerable growth and expansion in the shipbuilding industry. This opportunity was especially appealing to Tenneco because of an anticipated increase in shipping demand from the Alaskan North Slope oil fields. In addition, Tenneco had been negotiating with the Russians for a large sale of natural gas; therefore, this merger also provided an opportunity for "in-house" construction of liquified natural gas (LNG) tankers as well as large oil tankers.¹¹

—Litton Industries is a technologically oriented corporation which concentrates on growth through the development of new products for new markets, new products for old markets, and the improvement of existing products for existing markets. Litton planned to acquire other companies whose products and future might also benefit from technological innovations and management concepts which were then envisioned or believed to be forthcoming. The Ingalls Shipbuilding Company offered Litton an attractive opportunity to market its electronics technology. Litton management concluded that submarines were merely containers for the weapons systems which were being developed and marketed by its other divisions. Examples are printed circuits, computers, servomechanisms, communication equipment, and navigation gear. Furthermore, Litton believed that within 10 years the US Navy would be contracting out complete weapons systems, whereas in 1961 the shipyards were merely hull fabricators and assemblers. In purchasing Ingalls Shipyard below book value, Litton hoped to establish an advantageous position in order to take advantage of the orders it felt were sure to come.¹²

—Congoleum Corporation is the only conglomerate involved in the shipbuilding industry which had its origin as a shipbuilder. Its original firm, Bath Iron Works, was bought into by William Kyle in

1964. Before that time, Kyle had been a corporate entrepreneur, starting up companies, building them up, and selling them at a profit. His desire to run a quality company with a billion-dollar potential in an industry that was hard to get into brought him to Bath. Kyle seized control in 1967 and almost immediately began diversification with the acquisition of Congoleum-Nairn.¹³

Very few of the foregoing corporations had achieved their expectations at the time of this study. In fact, virtually all of them have lost money. It is interesting to note, however, that with the exception of the Quincy Yard, which Bethlehem Steel sold to General Dynamics in 1963, no major shipyard has changed owners since being acquired by a conglomerate. Shipbuilding has become a "financial" game which the conglomerates are still learning to play. Conglomerates are similar to "elephants," and it could easily have been predicted that their size, financial strength, and political power would have already made it possible for them to create and pursue thoughtful campaigns aimed at recouping their losses and achieving those expectations which are still realistic. One of the major reasons why the current controversy has been sustained and escalated is that the conglomerates are attempting to place it beyond the control of the US Navy. At this point in time, it remains to be seen whether their strategy will be successful, but the important point is that the shipyards have already been able to at least reduce the Navy's direct influence on resolution of the ongoing problems—both real and perceived.

US NAVY STRUCTURE
or
WHY DOES IT TAKE SO LONG FOR THE US NAVY TO MAKE
DECISIONS?

Defense decisionmakers have to find an accommodation between what reason tells them and what political realities impose. The Defense Department achieves this accommodation by applying a mixture of rational argument and bureaucratic bargaining.

Dr. Ralph Sanders

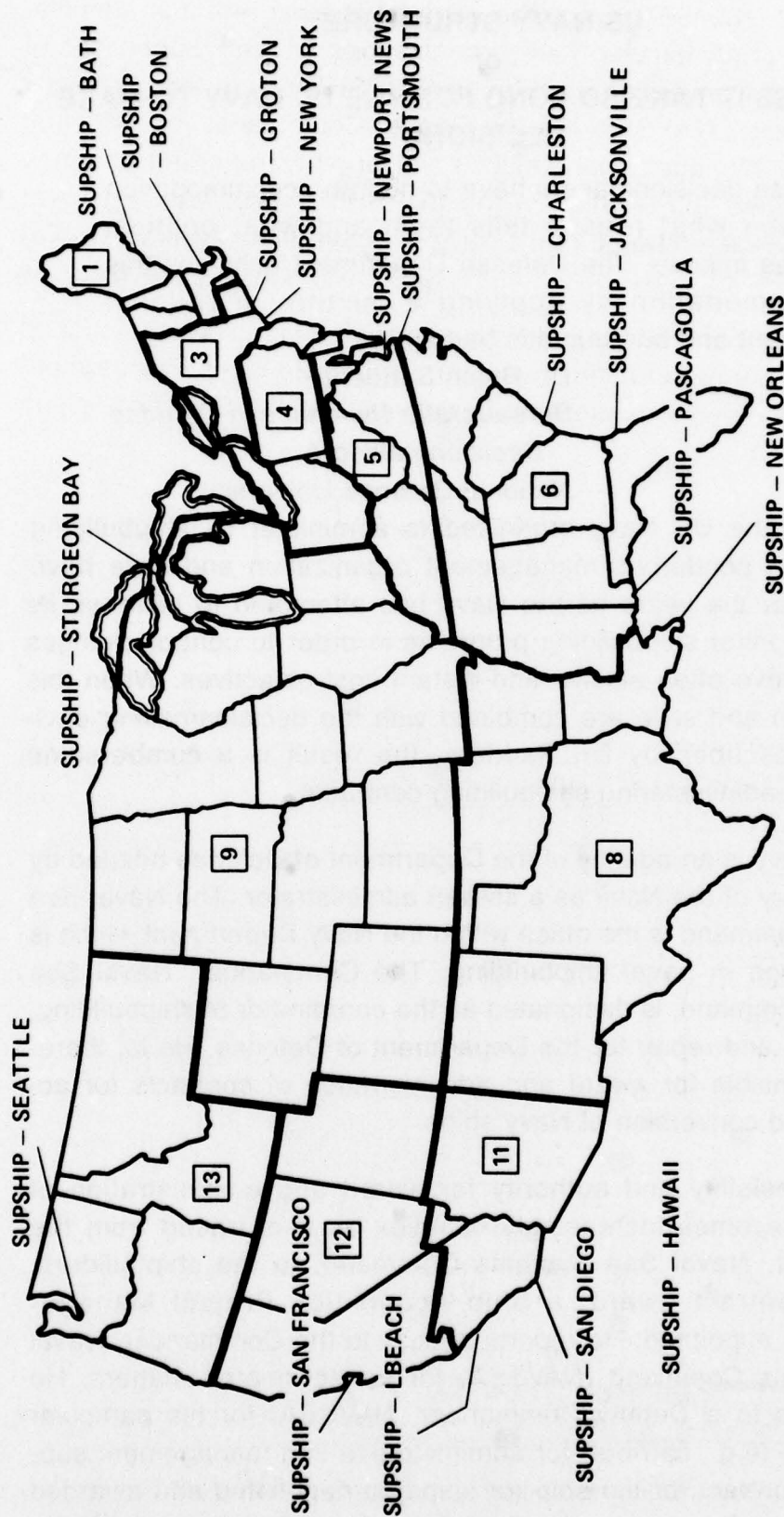
Bureaucratic Dynamics in Defense
*Decisionmaking*¹⁴

National Defense University

How is the US Navy organized to administer its shipbuilding contracts? A ponderous management organization and style have evolved over the years as the Navy has attempted to increase its ability to monitor shipbuilding programs in order to control changes and to achieve often elusive and distant cost objectives. When this organization and style are combined with the decisionmaking environment described by Dr. Sanders, the result is a cumbersome process for administering shipbuilding contracts.

The Navy is an agency of the Department of Defense headed by the Secretary of the Navy as a civilian administrator. The Naval Sea Systems Command is the office within the Navy Department which is most involved in naval shipbuilding. The Commander, Naval Sea Systems Command, is designated as the coordinator of shipbuilding, conversion, and repair for the Department of Defense. He is, therefore, responsible for award and administration of contracts for acquisition and conversion of Navy ships.

Responsibility and authority for award and administration of contracts becomes increasingly complex as it is traced from the Commander, Naval Sea Systems Command, to the shipbuilders. Prior to contract award, a Ship Acquisition Project Manager (SHAPM) is appointed. He reports directly to the Commander, Naval Sea Systems Command (NAVSEA) for project-related matters. He also reports to a Deputy Commander, NAVSEA, for his particular type of ship (e.g., carriers) for administrative and management support. The contract for the ship (or ships) is negotiated and awarded by the Deputy Commander for Contracts who also reports directly to



Source: NAVSEA Journal, July 1974, pp. 34-37. Boxed numbers denote Naval Districts.

Figure 2. Geographical Locations of US Navy Supervisors of Shipbuilding, Conversion, and Repair (SUPSHIP's)

Commander, NAVSEA. Once the contract is awarded, it is administered by 1 of 16 existing field organizations entitled Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP), who report directly to Commander, NAVSEA, via the Deputy Commander for Industrial and Facility Management—which is yet another reporting channel. Figure 2 shows the location of the SUPSHIP offices. As a general rule the officers in charge of the largest SUPSHIP offices are senior to the SHAPM's.

The SUPSHIP is tasked with specific responsibilities for ship construction by several directives, i.e., Armed Services Procurement Regulations, Navy Procurement Directives, and the Ship Acquisition

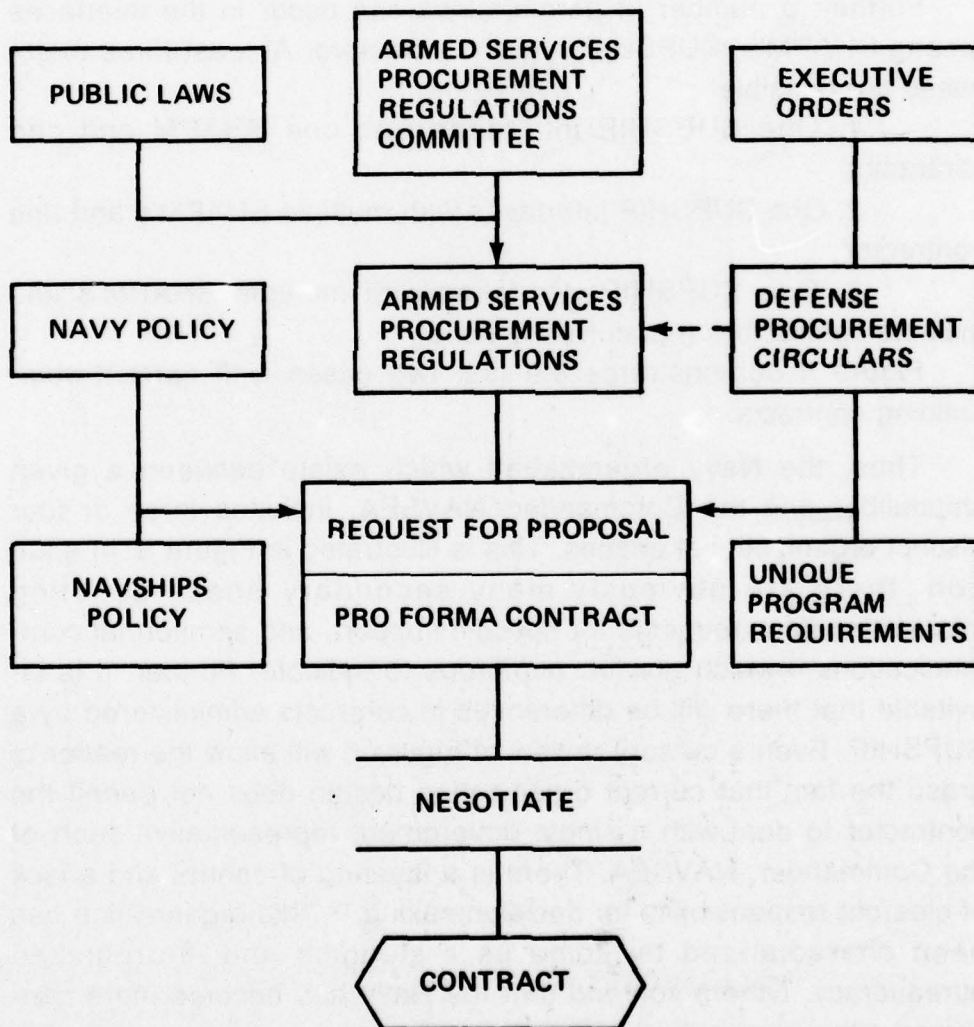


Figure 3. Flow of Guidance and Direction Affecting Development of a Shipbuilding Contract

Contract Administration Manual. In most cases the responsibilities set forth in these directives bear a one-for-one relationship to those of the SHAPM for the construction phase of acquisition; however, they impose another matrix organization, governed by separate tasking documents, on the already highly matrixed SHAPM organization. Figure 3 provides a simplified schematic depicting the flow of guidance and direction affecting a shipbuilding contract.

A nuclear ship involves a fourth organizational component reporting to the Commander, NAVSEA—the Deputy Commander for Nuclear Power. This organizational component also has direct access to the contractor for all items concerning the Nuclear Propulsion Plant.

Further, a number of permutations can occur in the interfaces among SHAPM's, SUPSHIP's, and contractors. At least three major cases are possible:

1. One SUPSHIP interfaces with one SHAPM and one contractor
2. One SUPSHIP interfaces with multiple SHAPM's and one contractor
3. One SUPSHIP interfaces with multiple SHAPM's and multiple contractors (not currently done)

Figure 4 demonstrates the first two cases with current shipbuilding contracts.

Thus, the Navy organization which exists between a given shipbuilder and the Commander, NAVSEA, includes three or four distinct organizational entities. This is illustrated in Figure 5. In addition, there are obviously many secondary lines—denoting information flow, requests for specific support, and semiformal communications—which are too numerous to indicate. Further, it is inevitable that there will be differences in contracts administered by a SUPSHIP. Even a cursory review of Figure 5 will allow the reader to grasp the fact that current organization design does not permit the contractor to deal with a single government representative short of the Commander, NAVSEA. There is a layering of control and a lack of clearcut responsibility for decisionmaking.¹⁵ This organization has been characterized by some as a sluggish and ill-organized bureaucracy. Others contend that the Navy has become more concerned with organization than with the skills and expertise to do the job.

The bottom line is that the complexity of decisionmaking increases geometrically with the number of organizations involved.

This is reflected in response time. In view of the fact that time equates to significant amounts of money in shipbuilding (e.g., Newport News has claimed \$55 thousand for each day of delay on a nuclear carrier), the way in which the US Navy is organized to conduct shipbuilding is undoubtedly contributing to the problems now being experienced in US shipbuilding.

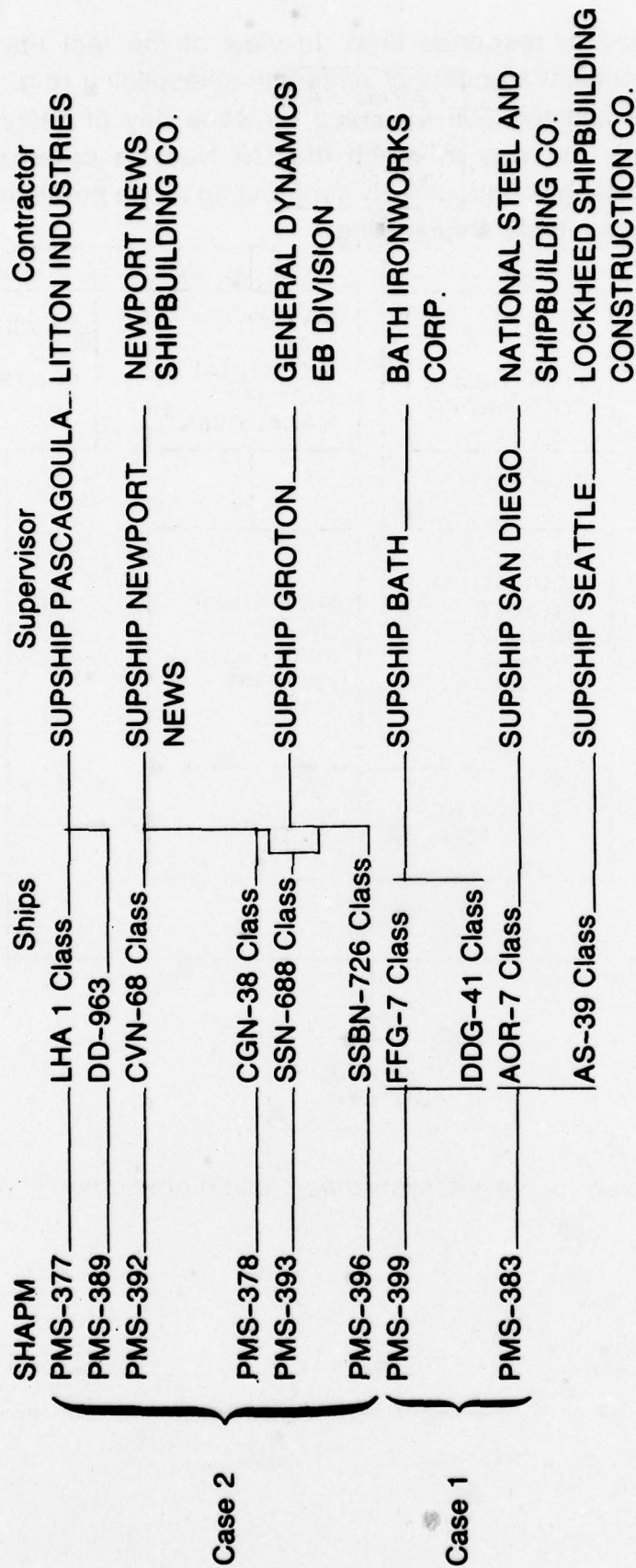


Figure 4. Examples of Interfaces Among Ship Acquisition Project Managers (SHAPM's), Supervisors of Shipbuilding (SUPSHIP's), and Contractors

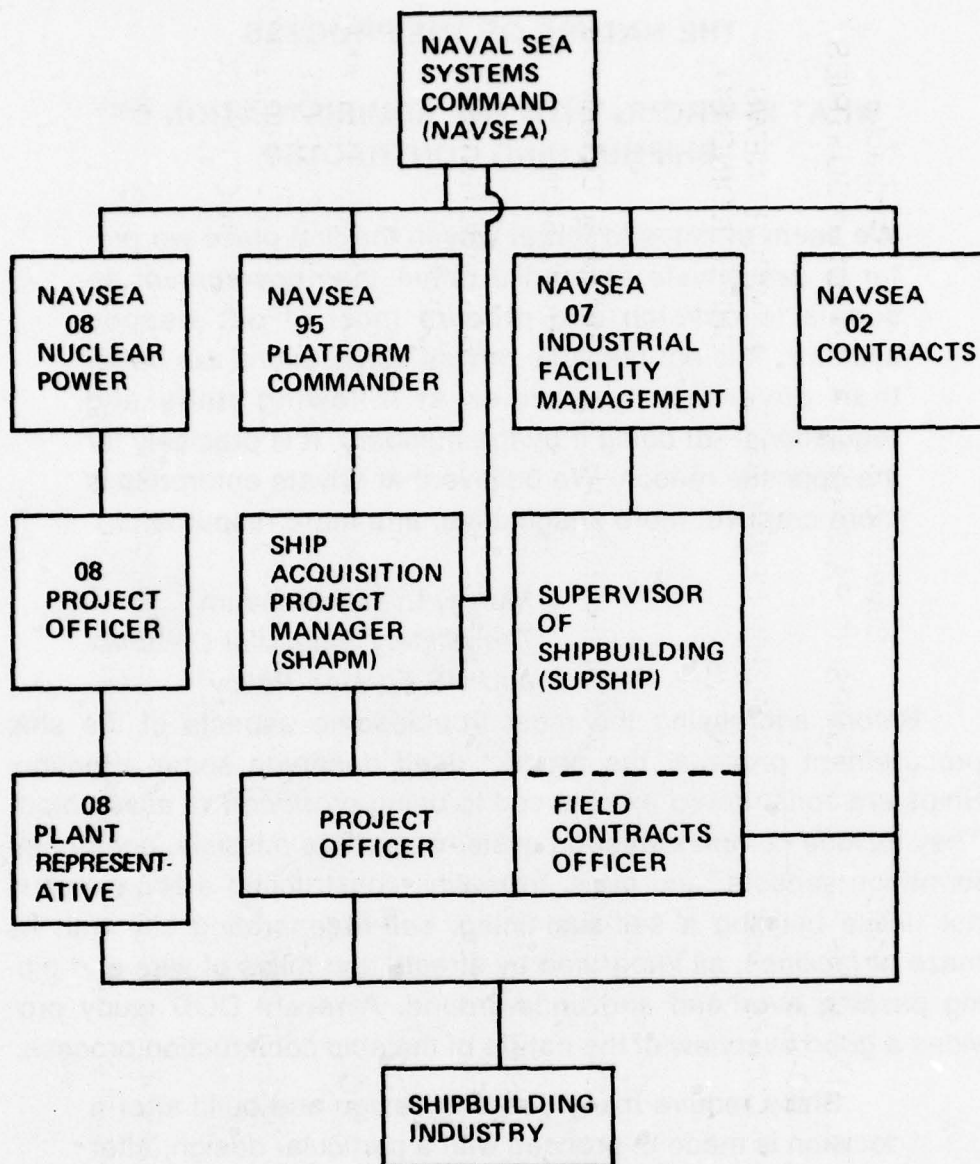


Figure 5. Navy Organization for Shipbuilding

THE NATURE OF THE PROCESS
or
WHAT IS WRONG WITH THE ADMINISTRATION OF
SHIPBUILDING CONTRACTS?

We seem at times to forget why in the first place we prefer to use private enterprise rather than government arsenals to develop and procure most of our weapon systems. It is not because private corporations are better than government agencies at following rules and regulations—at doing it by the numbers. It is precisely for the opposite reason. We believe that private enterprise is more creative, more imaginative, and more resourceful.

Murray L. Weidenbaum
*The Military Industrial Complex
and US Foreign Policy*¹⁶

Before addressing the most troublesome aspects of the ship procurement process, the product itself deserves some attention. Ships are *constructed* as opposed to being *produced* or *assembled*. They include complex weapon systems such as missiles, combat information sensors, and guns. In reality, constructing a Navy ship is not unlike building a self-sustaining, self-regenerating city with its maze of facilities, all integrated by streets and miles of wire and piping passing overhead and underground. A recent DOD study provides a good overview of the nature of the ship construction process:

Ships require many years to design and build after a decision is made to proceed with a particular design, after which they are produced in relatively small numbers. The process of defining the ship to be built requires 2-4 years and is heavily influenced by the design requirements of the combat systems to be included. Once built, naval ships typically enjoy a useful operational life of 30 years or more, during which they may be upgraded from time to time with improved combat systems or other new capabilities reflecting technological advances occurring throughout their lives. Ship design must provide the capability for such growth.

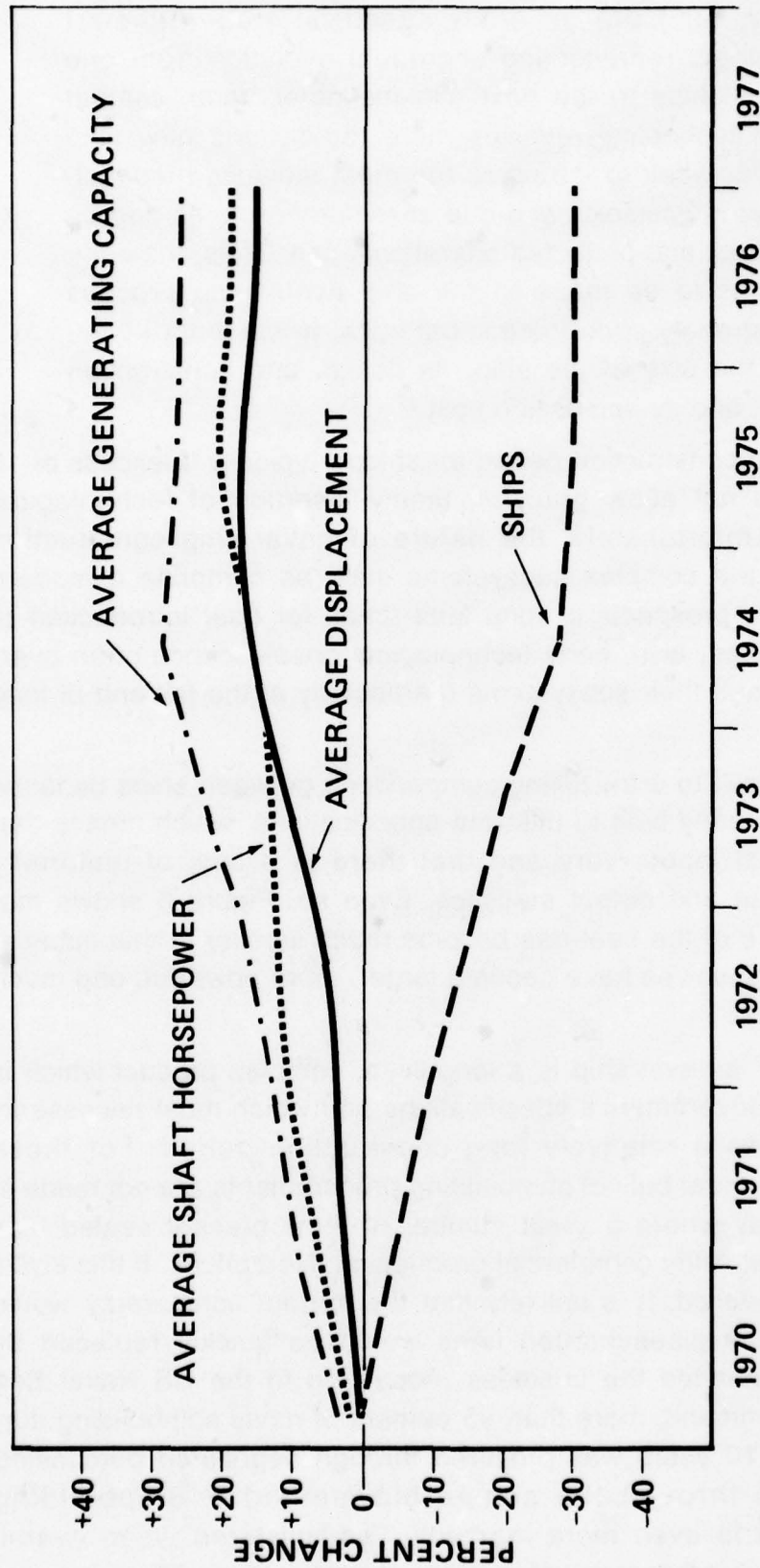
The platform characteristics of most new ships (i.e., hull form, propulsion, speed, range, seaworthiness, hab-

itability, etc.) are generally based on state-of-the-art technology, representing a gradual evolution from one class of ships to the next. On the other hand, combat system technology evolves more rapidly and new ship programs seek to introduce the most advanced technology that is possible, with due consideration to its degree of maturity and projected operational use. Thus, the early decisions to be made in the ship acquisition process focus strongly upon the combat suite, which in turn influences the size of the ship, its design and construction details, and its acquisition cost.¹⁷

The long construction period for ships—typically in excess of 10 years—does not allow graceful, timely insertion of technological advances. Unfortunately, the nature of naval ship construction means that the complex subsystems such as comprise a modern ship face the prospects of long lead times for fleet introduction of new capabilities; also, early technological obsolescence often overtakes ships and their subsystems (particularly at the tail end of long programs).

It is difficult to draw telling comparisons between ships because they are generally built to different specifications, which means that their material inputs vary and that there is a lack of uniformity between input and output statistics. Even so, Figure 6 shows that while the size of the fleet has become much smaller in this decade, the ships themselves have become larger, more powerful, and much more complex.

In short, a naval ship is a long-lived, complex product which is built to the Government's specifications and which must necessarily evolve during a relatively long construction period. For these reasons, the great bulk of shipbuilding procurements are not made in circumstances where a great number of firms present sealed bids offering to sell fairly commercial products at fixed prices. If this idyllic situation prevailed, it is unlikely that the current controversy would exist, because disenchanted firms would be quickly replaced by others who needed the business. According to the US Naval Sea Systems Command, more than 95 percent of naval shipbuilding during the last 10 years was procured through negotiated purchasing rather than through the sealed-bid method.¹⁸ Shipbuilding procurement is even more markedly "administered" than overall Government procurement of military material, over 80 percent of



Source: Department of Defense Annual Report, Fiscal Year 1979, p. 189.

Figure 6. Measures of Average Size and Complexity of US Ships

which was procured through the negotiated purchasing method over a similar 10-year period.¹⁹

Thus, given an understanding of the nature of the product, it is not surprising that the relationship between the US Navy and its shipbuilding contractors is not unlike the relationship between the Department of Defense and the major weapon systems contractors. The Navy-industry relationship can be seen as one facet of the broader, military-industrial complex. There are, of course, sound reasons why such a relationship has evolved and definite benefits are forthcoming from it, in terms of the efficient and economical production of weapons needed for national defense. Nevertheless, the system is not perfect, and shipbuilding procurement is not exempt from the problems and disadvantages that are part of such a close Government-industry relationship.

The high-technology shipbuilding market, discussed above, makes contractors subject to the changing needs of the governmental customer. This allows the Government to use the selection process to control entry and exit, affect the growth of the firms involved, and impose its way of doing business on the participating companies. Indeed, the historic relationship between the Navy and its shipbuilders is *more* encompassing than the formal regulation by Federal agencies of companies which sell in markets where the Government is a major determinant of price, as in the case of public utilities, agriculture, or mining.

Murray L. Weidenbaum, in his economic analysis of the military-industrial complex, discusses some of the adverse side-effects that occur in this relationship.²⁰ He focuses on the total relationship, not on any specific military service or private industry. Nevertheless, his comments and insights are equally, if not more, applicable to the Navy-shipbuilding industry interface, and are recommended reading. In sum, Weidenbaum argues that the Government (read "Navy") has become so closely involved in the internal operation and management of its contractors (read "shipbuilders"), that it has inhibited the efficiency and performance of these companies; the ultimate result has been a poorer product, in a longer time, at a higher cost. Weidenbaum relates in detail many of these ills—the very same ills that plague the procurement of naval ships. Weidenbaum cites particularly the myriad procurement regulations that bind a contractor, making the company, in effect, a quasi-public agency. All this regulation is made possible, he argues,

through the "unilateral exercise of the government's strong market position."²¹

Can the US Government, in this case the Navy, continue to exercise its traditionally strong market position in the future? Perhaps not. A change in the shipbuilding industry structure has occurred over the past decade. The increasing concentration of the industry into a relatively few large corporations and conglomerates, to whom shipbuilding represents only a small segment of their overall, diversified operations, casts doubt upon the prospect of the Government maintaining so favorable a position. The conglomerates are not so specialized as to be dependent upon government shipbuilding contracts. The shipbuilders now have both the capability and the will to change the ground rules for procurement of naval ships. The outcome of this struggle is still in doubt, and this is a major reason why the present controversy continues unabated.

SYNOPSIS OF THE PROBLEM

or

DESCRIPTION OF A FINITE BUT UNBOUNDED CONTROVERSY

This analysis business reminds me of the way they used to weigh hogs in Texas. They would get a long plank, put it over a cross-bar and somehow tie the hog on one end of the plank. Then they'd search all around till they found a stone that would balance the weight of the hog and they would put that on the other end of the plank. And then they'd try to guess the weight of the stone.

Anonymous Northerner

There is a proliferation of material which describes the current adversarial relationship and offers recommendations and solutions. Most of it is written by a small group of authors who repeatedly refer to each other and who hold extremely partisan views. A great deal of this analysis seems to be analogous to the way they used to weigh hogs in Texas. The fact remains, however, that during the last 8 years, a cold war of economics and nerves has persisted between the US Navy and the commercial shipyards that build naval vessels. Further, relations had already deteriorated to such a point in 1974 that Congress was prompted to hold extensive hearings which resulted in a mandate from Congress ordering the Navy to take steps to improve the situation.²²

Industry and the Navy do not completely agree on the causes of their collective problems. Each side tends to defend its own position and at the same time attack the other side. The fundamental problem is not the ongoing routine contract administration problems associated with quality assurance, constructive changes, late and defective government-furnished information and equipment, or inadequate specifications. Nor is it unpredicted escalation of changing requirements during the construction period. These issues do have an impact but they are not new to an industry which has produced warships in the United States for two centuries. The treatment of these issues in claims and other forums should not be dismissed for it is symptomatic of broader underlying causes which must be addressed in order to de-escalate the controversy.²³

The root cause of the current "adversarial relationship" is a revolution by the shipbuilders and their conglomerate owners against stifling control and bureaucratic decisionmaking exercised through

governmental regulations and multilayered management. The following quotation was taken from a study made by the National Security Industrial Association and is typical of industry's attitude on this issue:

The evolution of the defense acquisition process during the past two decades has produced excessive and redundant levels of management in both DOD and Industry. Accompanying this, there has been a proliferation of functionally specialized staff groups that tend to view their functions as ends in themselves. As a consequence, management authority has been diluted and management responsibility obscured.²⁴

The report goes on to recommend that both Industry and Government should eliminate unnecessary layers of management and functional staffs, and improve procedures to provide effective coordination and control. The Program Manager should be given total program responsibility and authority, including technical and contractual. He should be a Contracting Officer. Continuity of management might be increased by assigning the Program Manager earlier and retaining him longer.²⁵

The current shipyard owners have financial strength, managerial depth, political clout, and tenacity. They are strong enough to survive without future business from the US Navy; therefore, they have set out to make the shipyards into the profitable "cash flow machines" which were envisioned when they were acquired.

Some Navy officials are greatly offended by this aggressive attitude; but as the Government has the ultimate weapon—money—the conglomerates must employ whatever tactical advantage they can devise. An indication of their staying power can be derived from the fact that Newport News Shipbuilding and Litton Industries turned down the relatively generous offers sponsored by Deputy Secretary of Defense W.P. Clements in 1976 for an immediate "no fault" settlement of their claims under Public Law 85-804.²⁶

The shipbuilders' plan of attack included at least two interrelated campaigns. The first was an attempt to recoup losses which are attributed to existing contracts with the US Navy. This campaign has been carried out with skillful rhetoric and has capitalized on varying degrees of involvement by multiple layers of US Navy and Defense Department management. A unique cornerstone to this campaign is

an almost total disrespect for the binding nature of both the contractual document and historical methods of administering contracts. The issues have not just been aired—they have been hyperventilated. In the conflicting currents of both public and private discussion and analysis, it has been virtually impossible for the US Navy to develop a unified position. There has, in fact, been a marked unwillingness of various US Navy factions to subordinate self-interest in favor of common interest.

This campaign has been successful in mobilizing public opinion against the US Navy. Even the banking community is now almost unanimous in condemning the US Navy for mishandling the shipbuilders' claims.²⁷ It has now come to the point that a prominent member of the Carter administration, Edward R. Jayne, has made the following statement for public dissemination: "'Present shipbuilding difficulties' are why President Carter did not give the Navy enough money to build its coveted 60-ship fleet."²⁸ This appears to be a clear message from the administration that ships are not critical to the national defense unless the shipbuilders are satisfied with their claims settlements. This would appear to be an unmistakable victory for the shipbuilders and their owners.

The second campaign is the one on which our recommendations will ultimately focus. It has been directed toward changing the US Navy's contracting policies and procedures to virtually insure that losses will not occur in the future and to restrict involvement by the Government in internal company management. This campaign has been championed by shipbuilders such as Newport News Shipbuilding and Drydock Company and Electric Boat Division of General Dynamics, who are the only current builders of nuclear ships. The following statement made by Mr. John Diesel, President and Chief Executive Officer, Newport News Shipbuilding, before the Seapower Subcommittee of the House Armed Services Committee in 1974, is typical of the rhetoric advanced in this campaign: "Either the Navy . . . will develop fair, straightforward and evenhanded procurement policies or it will eventually build all its own ships."²⁹ The thrust has been to modify the contractual document to reduce the contractor's risk and to assure cash flow. This strategy has already been partially successful. The current escalation and energy "pass through" clauses are examples of such contractual changes.³⁰

Other ongoing initiatives include proposals to circumscribe the government's involvement in internal operations by setting baselines

at the time of contract award for systems such as security, property control, subcontracting procedures and practices, and by restricting the number and scope of government audits of such systems after contract award. The shipbuilders are also pushing for a point of contact within the government who will be relatively knowledgeable and permanent and who will have the same independence, responsibility, and authority as his contractor counterparts. An example of this type of initiative from a recent contractor proposal follows:

In the event that upon appeal of a contracting officer's final decision hereunder it is determined by a board or court that such final decision was not independently or impartially rendered, or that such decision was arbitrary or in bad faith, the Navy agrees that the contracting officer rendering such decision will be precluded from rendering further final decisions with respect to this contractor. The Navy further agrees that it will confer with the contractor in the selection and appointment of replacement contracting officer with authority to render final decision with respect to this contractor.

The contractors have further proposed numerous other innovative, precedent-setting contractual changes, not the least of which are some which address the right of the government to issue changes unilaterally without prior agreement with the contractor. Other proposals are aimed at reducing the number of changes issued by the government, as well as reducing the time and effort required to reach agreement on the price and other effects of changes which must, in part, be issued.

This is not to say that the US Navy is not interested in the same end results. Unfortunately, the US Navy's current policies, procedures, and organizational structure work against achieving these results in a timely manner. This is evidenced by the number of open changes which are included in, or are incident to, the enormous claims which have been submitted by the shipbuilders.

In summary, the "adversarial relationship" between the US shipbuilding industry and the US Navy is basically a power struggle which was initiated by the industry but which has been doggedly resisted by the Navy. The ability of the shipbuilders to wage what has become a successful war of attrition is not surprising when both the industry structure and the Navy's bureaucratic organization are con-

sidered. It is time for the Navy to cut its losses by acknowledging that the shipbuilders may be holding a winning hand. Settlement of the shipbuilders' claims is outside the purview of this study, but we can now specifically address some recommended changes to the contractual process which should appeal to everyone.

RECOMMENDATIONS

or

LET THE PLAYERS PLAY A NEW GAME

Creative leadership lies in fashioning of policies that effectively link means to ends—that alter an existing reality to some desired future order.

Robert L. Pfaltzgraff, Jr.
"The United States and a
Strategy for the West"³¹

It is not unusual for the parties to a bargain to find that, after a contract has been executed, there is a disparity between the outcomes which were envisioned and those which were realized. Given an understanding of the complexity of naval ship construction, it should not be too difficult to understand why contracting for a naval ship is not an easy task or why the subsequent lengthy building period is fraught with opportunities for disagreements between the Navy and the shipbuilder. It is doubtful, therefore, that shipbuilding claims can be forever eliminated. This point was recognized by the Honorable Edward Hidalgo, Assistant Secretary of the Navy (Manpower, Reserve Affairs and Logistics), in a statement before the Seapower and Strategic and Critical Materials Subcommittee of the House Armed Services Committee:

As important as it is to dispose of existing shipbuilding claims, it is no less critical to create a framework through contract formulation and administration that will reduce the potential for future claims to a minimum.³²

The problem, of course, is to equalize the perceived risk at the outset so that neither party will be inclined to challenge the contractual agreement at a later date merely because he now realizes that he made a bad business deal. In the case of ships this is an especially difficult task. As noted above, the product is unlike any other product which is procured in the Defense acquisition process.

The following recommendations will be grouped into two major categories—procedural changes and contractual changes. In both cases, the purpose is to streamline the administrative process while curtailing influences external to the contractual process. They are all modifications to the US Navy's existing way of doing business, which is tacit recognition that the shipbuilders will ultimately succeed in

their campaign to force the US Navy into modifying its policies and procedures.

Procedural Changes

Preaward Survey. When the Navy awards a contract to a shipbuilder it is really buying two things: (1) hardware and (2) management. This a *key and vital* point. The Navy is paying the contractor to manage his performance under the contract. It stands to reason, therefore, that the Navy should be convinced prior to contract award that the contractor's facilities, manning (actual and projected), yard capacity, and management systems are adequate and in place so that the contractor's management can be left to execute his part of the bargain.

History indicates that NAVSEA either has been unable to accurately assess the ability of contractors to build ships within given time frames or has been unwilling to accept the results of its pre-award surveys. This situation was formally documented in the exhibits which the Honorable W. Graham Claytor, Secretary of the Navy, recently provided to the Senate Armed Services Committee during hearings on the proposed PL 85-804 settlements with General Dynamics and Litton Industries.³³ In either event the function should be taken away from NAVSEA and placed with a group which has the same independence as the Navy's Board of Inspection and Survey or its Engineering Propulsion Examining Boards.

The purpose of this group would be to provide independent and unbiased verification that the contractor is fully capable of achieving the cost, technical, and schedule parameters which will be established in the contract. It would also establish base lines for all major contractor systems such as quality assurance, purchasing, cost control, security, and property control. The NAVSEA would be prevented from awarding contracts until the established contractual parameters agreed with the Survey Board's findings or until the Chief of Naval Materiel has personally issued a waiver overriding the findings.

Contractor-Government Interface. The apparent and unnecessary dispersion of authority portrayed in Figure 5 must be modified to reduce the multiple combinations of vertical and horizontal management, to allow more rapid and positive adaptation to changing conditions, and to speed up decisionmaking by shortening communications channels. The current system forces the SHAPM to

build alliances which supplement his legal authority. Many times such alliances are with organizations which are headed by officers who are senior to him. For example, the SUPSHIP's at Newport News Shipbuilding, Electric Boat Division of General Dynamics, and Ingalls Division of Litton Industries are all commanded by officers who are senior to the SHAPM's who deal with them.

The simplest and most obvious solution would be to return to the decentralized management of shipbuilding which was common during World War II. This could easily be done by placing *all* acquisition functions, including contract award and administration, under a highly qualified, senior SHAPM, and by moving the SHAPM to the shipyard. This would give the shipbuilder a single point of contact. This approach would also insure that the SHAPM has the necessary awareness and understanding of his contractor's management philosophy, policy, problems and internal operations which will allow him to make decisions on the basis of overall program performance. Sweden uses this approach with excellent results.³⁴

The SHAPM could still maintain a liaison office in Washington, DC, but as noted above, his primary function would be to act as the only interface between the contractor and the government for his program. In this regard, he would be responsible for all program budgeting and funding, and would be able to authorize modification of his assigned contracts up to the Naval Materiel Command's limit of \$10 million without prior approval from anyone. This would, of course, mean that the SHAPM's must be selected from the most talented officers in the US Navy.

Contracting Officers. Shipbuilding contracts are currently awarded and administered by two or more contracting officers who are not part of the SHAPM's organization. In addition, multiple review levels exist which do not have any responsibility for program execution. At a minimum, this system diffuses responsibility and makes it virtually impossible for either the SHAPM or the contractor to achieve rapid response on anything but the most urgent contractual issues.

If the preceding recommendations were adopted, each SHAPM would have his own dedicated contracting officer who works directly for him as opposed to the NAVSEA Contracts Directorate or the applicable SUPSHIP. This contracting officer would be responsible for negotiating, awarding, and administering the contract, and would give his undivided attention to the SHAPM's needs.

West Germany's contracting officers must also be practicing lawyers.³⁵ Insofar as the US Navy is generally at a disadvantage at the negotiating table because many of its negotiators are inexperienced when compared to their industry counterparts, the US Navy should give serious consideration to adopting this approach. It would provide some personnel savings by combining functions, but its most important corollary benefit would be to place NAVSEA's lawyers in the role of decisionmakers, as opposed to advisors who provide cautious alternatives for resolving other people's problems. The Navy's current reliance on lawyers in an advisory capacity encourages overcaution to the point of indecision. This change alone would appreciably decrease the time which is now required to make decisions.

Change Control Boards. Virtually all shipbuilding programs have some sort of change control system. In truth, however, almost none of them are really effective in preventing nonessential changes.

Change control boards should remain under the SHAPM, but they should be made to strictly observe the following guidance. A change may not be made unless it (1) is essential to allow the ship to accomplish its mission, (2) is required for safe effective operation of the ship, or (3) involves safety of personnel or equipment. This would not be an impossible task. Other countries (e.g., West Germany) have been able to defer nonessential changes to the first modernization period after ship delivery.³⁶ Compliance with this guidance should be reviewed periodically by the Navy's Inspector General. The SHAPM's who have been unable to control changes in their programs should be reprimanded and replaced.

US Navy Trial Crews. Trial crews for nuclear ships sponsor a significant number of minor changes which usually vary from ship to ship depending on the proclivities of the crew. These crews also occasionally become a source of friction between the shipbuilder and the Navy because they conduct inspections based on varying interpretations of the building plans and specifications.

Sweden has partially solved this problem by using a special crew to conduct sea trials. The "trial" crew passes the ship to an "operational" crew after the ship has successfully completed acceptance trials and then goes to work on the next ship which is in line for delivery.³⁷ The US Navy should seriously consider this approach since it effectively eliminates numerous changes in minor ship

characteristics which occur merely because each commanding officer has his own ideas about how a ship should look and operate. It would also mitigate the problem of varying interpretations of the plans and specifications.

The foregoing recommendations were procedural in nature. The following recommendations deal specifically with changes which should be made to the contract itself.

Contractual Changes

Approvals. As noted above, part of the contract price is paid for effective management by the contractor. He should be both required and allowed to do so. Given that the preaward survey approved all of the contractor's systems, there should only be a limited need for approvals during contract execution. These would be limited to new processes or waivers and deviations from contractual requirements. This is to say that surveillance should be substituted for prior approvals. For example, Great Britain, France, and West Germany do not require any sort of prior approvals for subcontracts.³⁸ Neither should the United States. The contractor should be free to proceed without hindrance as long as he complies with the procedures which are set forth in his approved system.

Audits. Another constant source of irritation between the Government and the shipbuilders is the redundant set of checks and balances which have become so encrusted with refinements that the rigor sought comes closer to *rigor mortis*. Further, various agencies other than the Navy have requirements to conduct reviews, e.g., the Defense Contract Audit Service is responsible for security.

Given that the preaward survey has been conducted properly, there should be no need to completely revalidate systems more often than every 2 years. This is not to say that surveillance should not be performed on a day-to-day basis. It does mean that full-fledged audits will not be conducted unless 2 years elapse between preaward surveys. A specific agreement regarding these audits should be set forth in each contract. They should be performed by the same outside agency assigned the task of accomplishing the preaward surveys referred to above.

Arbitration. It is doubtful that the Navy will ever again be in a "claims free" environment. Claims have become institutionalized because they now provide the only real outlet for legitimate differ-

ences between the shipbuilders and the US Navy and, equally important, because the shipbuilders now have sufficient financial resources and backing to allow them to wait through years of analysis and litigation before the dispute is resolved.

France, England, West Germany, and Sweden use a system of arbitration which appears to be more effective than our system. In fact, the general consensus of the procurement officials in these countries is that they would much rather settle disputes than submit to arbitration with its established time limits and tough regulations.³⁹ It should be noted that the United States financial community also feels that the Government should adopt binding arbitration as a provision for dealing with claims.⁴⁰

The clause used in England is quoted below to illustrate the simplicity of the concept.

Arbitration (English Law)

All disputes, differences or questions between the parties to the Contract with respect to any matter or thing arising out of or relating to the Contract, other than a matter or thing as to which the decision of any person or persons named in the Contract shall be final and conclusive and except to the extent to which special provision for arbitration is made elsewhere in the Contract, shall be referred to the arbitration of two persons, one to be appointed by the Ministry and one by the Contractor, or their Umpire, in accordance with the provisions of the Arbitration Act, 1950.⁴¹

Contract Modifications. Lastly, and perhaps most important of all, a streamlined system must be devised to incorporate mandatory changes into the contract. A major reason for the current delays in reaching agreement on the pricing of changes is that it is almost impossible to achieve the degree of precision now required to demonstrate the "cause and effect" of a change.

Reasonable precision should be sufficient given that direct impact of all changes to a shipbuilding contract has historically run only about 5 percent of the contract price. It should be possible, therefore, to develop a mechanistic system to price out the impact of changes.

Such a system would include five essential elements. First, a standard rate would be established for delay and disruption at the

beginning of the contract. This rate would be a function of the man-hours negotiated for a change. It could be a multiple rate which would vary with the stage of construction or it could be a single rate. The rate might also only be used for changes which involve less than 10,000 production manhours or it might be used for all changes. In any event, it would be fixed and nonnegotiable by either party. It is recognized that establishing such a rate would not be equivalent to establishing cause and effect for each change, but the twin benefits of not having to pay for preparation or delay and disruption proposals and of not having to analyze and negotiate them far outweigh this traditional requirement. Further, this will make the cost estimates for changes more realistic since delay and disruption costs are very seldom factored into price estimates. This could, in turn, tend to restrict the number of changes issued.

Second, a standard formula should be established which utilizes the production manhours associated with a change to determine an extension in the contract delivery date. Like the delay and disruption rate discussed above, this formula could be varied with the stage of construction, or it could have a maximum or minimum limit before it is utilized. Commander H. L. Sipple has written a paper entitled "Let's Pay for Shipbuilding Changes as We Go—One Element of Shipbuilding Claims," which recommends another method of addressing the problem, calculating delay in a mechanistic manner.⁴² The point is, the method of calculating delay should be nonnegotiable for all but the most complex, very large changes. Again, the benefits of having such an agreement would seem to far outweigh the requirement to show cause and effect.

Third, standard labor and overhead rates should be negotiated periodically throughout the life of the contract as is done now every 6 months by most of the major shipbuilders. Further, standard amounts should be set for certain types of changes such as minor repairs to government-furnished material, administrative changes, and changes which involve less than 500 productive manhours. Experience already exists with these techniques; however, they should be formalized in the contract itself.

Fourth, the only element of a change which would normally be open for negotiation, unless the change exceeded some contractually agreed-to threshold, would be the number of manhours, material costs, the profit rate, and the adjustment to the ceiling price of the contract.

Finally, the clause should contain some real penalties for failure of the shipbuilder to submit proposals within a reasonable period of time and for failure of both the parties to reach agreement on changes within a specified time limit. A reasonable approach would be for the shipbuilder to receive a lower profit if he failed to submit a proposal within 45 days. The quote should remain valid for 180 days after which time the change would be automatically referred to binding arbitration if agreement has not been reached.

Summary

The thrust of the foregoing recommendations has been to suggest a restructure of the environment in which shipbuilding contracts will be administered. The central themes are to gain agreement on virtually all of the troublesome areas *before* the parties sign the contractual agreement, and to limit the government's participation in the construction process to system surveillance.

The recommendations for a group outside NAVSEA to perform the preaward survey and for binding arbitration of changes over 180 days old are directed toward reducing the need for both parties to use their power bases to either generate or hinder extra-contractual settlements such as claims or assistance under Public Law 85-804.

Implementation of these recommendations will go a long way toward removing all of the crutches currently used by the government to shift responsibility for problems to the contractor; at the same time, these recommended approaches should encourage contractors to use their considerable management talents to meet quality and schedule constraints while minimizing costs to improve their profits.

ENDNOTES

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16. Murray L. Weidenbaum "The Military-Industrial Complex: An Economic Analysis" in *The Military-Industrial Complex and US Foreign Policy*, ed. Omer L. Carey (Pullman, Washington: Washington State University Press, 1969), p. 39.
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18. Shipbuilding and Overhaul Purchase Division, Contracts Directorate, US Naval Sea Systems Command.
19. Weidenbaum, "Military-Industrial Complex," p. 33.
20. *Ibid.*, pp. 33-38.
21. *Ibid.*, p. 36. Weidenbaum cites many of the Armed Services Procurement Regulations sections which restrict firms doing business with the Department of Defense, such as ASPR Sections 3-900, 1-800, 1-707, 7-203.8, 6-100, 3-800, 1-1700, 12-601, 12-102.3, 7-600, 3-902.1, 1-323, 1-327.1, 1-315, 15-205.37.
22. Seapower Subcommittee, *Current Status of Shipyards, 1974*.
23. See A. J. Kelly, "Can Weapon System Procurement Be Managed?" *Defense Systems Management Review*, Autumn 1977, pp. 1-5.

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25., *Ibid.*, pp. 40-42.

26. *US Code*, vol. 50, sec. 1431 et seq. Since 1958, various agencies (including the Department of Defense) have been authorized to provide certain types of extraordinary relief to contractors who are encountering difficulties in the performance of government contracts or subcontracts relating to national defense. The "extraordinary" relief proposed by Deputy Secretary Clements was known as an "amendment without consideration." This type of relief circumvents traditional rules of government contract law, general contract law, and numerous decisions of the Comptroller General.

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